
Group 1

FDM Trainer Skills and Availability

**ECS506U Software Engineering
Group Project**

Problem/Domain Analysis Report

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1. Introduction

FDM Group is a leading expert in professional services. They follow a recruit, train and deploy model to help graduates, ex forces and returners to work, penetrate the current labour market. We are concerned with the train phase of the FDM group model. Particularly, we will be working on providing a solution for the Trainer Skills and Availability application in question.

Problem Definition

The client employs trainers with a wide range of skills from business analysis to software development and engineering. A group of employees categorized as the scheduling team are tasked with creating relevant training courses for consultants. Each course consists of different modules that change weekly. These courses can last any duration between 6 and 14 weeks. The application in question will need to provide a platform for the scheduling team to allocate a qualified and available trainer to the appropriate module of any given course.

Need for Application and Proposed Solution

Primary research dictates that a business with 250 employees generally spends 4 hours weekly planning meetings. This totals to 47,000 hours of lost productivity per year. (2021 Meeting Management) With that said, many businesses have chosen to adopt adaptable applications to eliminate this inefficiency. These applications include but are not limited to Calendly, Acuity Scheduling and Google Calendar. A common functionality among the former two platforms and a key feature of our software is the ability to check the availability of another user before booking a session with them. If that user has another event scheduled for that time slot, the system notifies the one attempting to reserve said time slot and blocks the new booking. Another common feature that will be shared with our software, are the automatic system notifications shortly prior to and when an event is scheduled to begin. The aforementioned competing softwares do also present a user friendly and intuitive interface, which must be prioritized during our software development.

The web application we aim to implement however, possesses a key functionality not available on its competitors. This is the capability to create courses that consist of modules and match trainers with specific skills to the appropriate course module. For example, a software development course may need to assign a trainer that is proficient in object-oriented design to one of its modules. The FDM scheduling team will only worry about choosing the desired time slots for the module and our platform will display all available and most importantly: qualified trainers, which in this case is any trainer who is qualified in object-oriented programming.

This software will also be specific to FDM Group in terms of its organization and infrastructure. As any FDM course can run between 6 and 14 weeks, the system will automatically prevent scheduling team members from choosing any duration outside of this range. The platform will be significantly different depending on the user. Scheduling team members will be able to create courses, schedule them, and assign appropriate trainers. Trainers will have a more abstract view of the platform in the sense that they will only be able to view their schedules, be notified when their sessions are beginning and edit their profiles with the appropriate skills and personal information. It is paramount that this web application be intuitive from the perspective of FDM Group employees who are aware of the organization's structure and training phase.

2. Customers and users

Our software will be used by the Training academies of the FDM Group in order to allow their respective scheduling teams to create activity courses, assign a trainer to each and alert the trainer when their scheduled course is about to start. Therefore our primary users and customers will be the scheduling team and the trainers.

Course Scheduling Team:

The scheduling team will be our main users who will be utilizing and benefiting the most from the software. A member from the scheduling team will be able to login with an account that will be given to them when they are employed by a training academy. With this account, they will be able to access the web portal where it will be possible to create the courses for their training academy, add a description for this created course, select a course type from a given list and assign a trainer with the relevant skills that match the course type. When selecting a trainer, they will be given a list of all of the available and qualified trainers based on the filters and course type, so they do not schedule a trainer that is already busy with another module during that time slot. If the scheduling team member is looking to book a specific trainer, they will also be able to access the full schedule of the trainer in order to find a time slot where a module could be inserted.

Typical scheduling team member:

- Adequate computer literacy.
- Complete understanding of the system in order to be able to create courses and assign trainers.
- Knowledgeable of FDM Group's structure and operations

Trainers:

Trainers will be the other user and will be less impacted by the software as they will have less use for the software. The trainer will be able to login with an account that will be given to them when they are employed by a training academy. With this account, they will be able to access the feature that will be most useful to them which is their schedule. Their schedule will include time slots in which they are booked for the week. Here, they can also choose to download the timetable so that it can be seen at any time when the trainer does not have internet access. They will also be able to edit their profile where they can add a description of their skills, professional knowledge and skill types from a pre-approved list in order to allow the scheduling team to easily assign courses to trainers that have the relevant knowledge. Their profile will also include all of their past work done at that training academy. Lastly, the trainers will also be able to input their mobile phone numbers and/or their email to their profile so that the system can automatically alert the trainer when a module is scheduled to begin soon.

Typical Trainer:

- Anywhere from basic to advanced computer literacy depending on professional skills. Will need an intuitive and simple interface to navigate
- Busy with preparing and teaching modules. Will need a fast system with little downtime so that no time is lost logging in and loading the schedule.

Developers:

The developers will be another user of our system. They will be maintaining the software after it has been developed and implemented. They will be updating the software in order to keep it compatible with the latest versions of the environment and they will also be fixing possible bugs and errors that may occur.

Typical developer:

- High level of computer literacy.
- Understands how the source code of the software functions in order to understand how to alter it.

Admin:

The system administrator will be the last user of the system. They will be responsible for the creation and maintenance of the scheduling team members and the trainers' accounts. The admin will set up these accounts for each employee when they first get employed so they can access the system. They will also be responsible for the deletion of these accounts when

an employee leaves the company or moves to another department. Also, in case a user forgets their login information, by contacting the admin, they will be able to reset their username/password and change this information. The admin user role was included as someone will be employed for this job.

Typical system administrator:

- Adequate computer literacy.
- Only needs to understand how the account management system functions

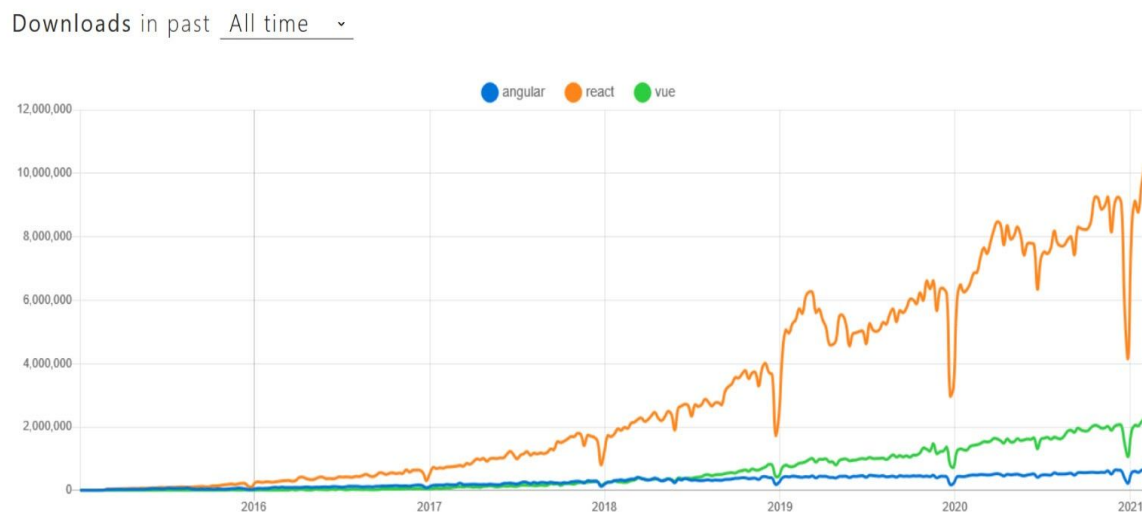
3. The environment

Our software will be developed as a progressive web application, the leading reason for choosing this platform is accessibility. FDM is a large company with many training academies[FDM, 2021] around the globe. Each academy will have a different team working with the application. As a result of this structure, different users may use different devices (MacBook's running macOS, laptops running windows or Linux or even mobile devices such as iPads) to interact with the application, however every one of these devices will have access to an internet browser and therefore access to the application. Another reason for using a web application is the fact that FDM has a pre-existing server structure where company data is stored, a web application would be able to easily interact with this server and will eliminate the need for additional infrastructure. A common problem with web applications is that they are unable to take full advantage of a device's resources which may lead to performance issues; however, this only affects complex web applications whereas ours will be relatively simple and will not require a large amount of system resources.

As we did not have contact with the client while producing this analysis, we must assume that there is no central existing software capable of performing the desired task. The current workflow may consist of the scheduling team manually checking records and emailing trainers in an attempt to organise a training course, the trainers may keep track of their sessions with their individual personal software (e.g., google calendar). Another assumption we made is that FDM currently uses a website/web application where all employees can view their employment and payment details (myHR for example). They also need to regularly check their inbox, meaning all employees currently use the web for work and would be able to use our web application.

Other platforms that we considered were the mobile platform (android/IOS) and desktop (MacOS/Linux/Windows). The mobile platform would be impractical to use because users would be restricted to using mobile devices where screen sizes range from 4.7 inches to 6.5 inches[Kolomiiets, K., 2020]. This may result in productivity issues as it will be difficult to represent a large amount of information in the form of a schedule, in an intuitive manner, on these smaller displays. Using the desktop platform would mean our application would have to be individually deployed to all the relevant employees' computer system and then

would require additional work to maintain (for example updating the application). A web application however, can be updated centrally and does not need to be deployed to each computer system.



(figure 1 <https://www.npmtrends.com/angular-vs-react-vs-vue>)

As seen in figure 1, react is the most popular frontend web framework and it is for this reason that we have decided to create our application using react. The overwhelming popularity of react suggests that the framework is well maintained and largely supported (on different internet browsers), and also suggests a large community is available to support us with problems during the development process.

Our application will only be utilised by the scheduling team and training experts which means there will not be a large number of concurrent users. Moreover, the amount of data and the complexity of the relationships between stored data is minimal. For these reasons we will use SQLite to store the data for our application, SQLite is lightweight and portable, meaning it will be compatible with FDMs current servers. Django will be used for the backend framework because it is one of the most popular and intuitive backend frameworks [Tripathi, S., 2020] with strong documentation. Our development team also has prior experience with python (the language that Django is built on) which will reduce the development time significantly as a new language will not need to be learnt.

4. Tasks and procedures currently performed

The FDM Trainer skills application is primarily going to be used by scheduling teams and the trainers, there will be admins who grant access to these users. Other users such as developers will also be involved but will only interact with the system in exceptional cases when required. All users will have unique tasks listed below under the user group.

Admin:

Create Account: To create unique accounts and grant application access/permissions to the trainers and the scheduling team members,

Delete Account: When a scheduling team member leaves or a trainer leaves the account needs to be deleted to terminate their access/permissions.

Reset Password: In case a user forgets their login details, they contact the admin who verifies the user's details and resets the password if they check out.

Scheduling Team:

Login: Scheduling team members must be given login to an account that has all the required permissions to partake all tasks related to scheduling.

Change Password: For when the user wants to change their login details to ensure security.

Create Course: Allows the scheduling team to create a new course which will run for the specified amount of time and at the specified time

Select Course Type: The user must select the type of a new course created from a given list and add a description to the course.

Create Module: Scheduling team member creates a new module, assigns it to an existing course and adds a description of the module

View Trainers with Specified Skills: Each module must have a trainer skilled according to the type of the course and module. Before adding a trainer to a module, the system must filter out any trainers who are not available and qualified. The view must display all the trainer's skills and their previous assignments with FDM.

Add trainer to course: Once a trainer with a given skill that is also available has been chosen, the user must be able to add them to the course. Once a trainer is added, the system must automatically notify them by email, phone or an application notification.

Trainers:

Login: The Trainers must be able to login to an account provided once they get employed.

Change Password: For when the user wants to change their login details to ensure security.

View Schedule: The trainers must be able to see their timetable, which module they are assigned to and when it will take place.

Download Schedule: The trainers might want to have a local copy of their schedule to use when they are offline so there must be an option to print/download the timetable.

Edit Profile/Add Skills: The trainer will be provided with an option to add skills from a given list. This will allow the system to match it to a specific module to prove that the trainer is qualified to teach it.

Edit phone number/email: The trainers must add an email and a phone number so they can be notified about any new courses they are assigned to. They will also be allowed to edit or add alternatives.

Developers:

Will not contribute to the daily operations, only when required by anomalies in the software such as bugs, to update/fix the software.

5. Competing software

Calendly

Calendly was officially launched in September 2013 and is a well-known scheduling mobile and web application with more than 5 million active users. It allows users to create their schedule with many other user-friendly customisation options. Also gives users some advanced features of synchronising the user schedule from other scheduling applications.

Acuity Scheduling

Acuity Scheduling is an emerging name in the world of scheduling software which provides facilities to make schedules which can connect to most of the popular web applications like

Zapier, PayPal, Stripe, Google analysis and many more. It offers most of the advanced industry-leading features to their paid members for \$13-45(depending on the features) and also provides most of the common features to all of their customers for free.

Google Calendar

Google calendar is a product introduced by tech giants: Google. It is an application made for creating and editing personal schedules when signed in with a google account. It can also be used by teams so that the schedule can be shared within the team. It provides the facilities for creating an event and also notifies the user about the upcoming activities.

	Calendly	Acuity Scheduling	Google calendar
Key features	<ul style="list-style-type: none"> -Allows the user to make their schedule. -This schedule can be accessed by the user's clients to make a booking with them in their available time. 	<ul style="list-style-type: none"> -Allows the user to make their schedule. -Notifies about the bookings to the user and their clients. -Can make forms for clients to fill out forms at the time of booking so the user has the required information beforehand in one place. 	<ul style="list-style-type: none"> -Allows the user to create a schedule by using simple instructions and easy to use user interface. -different schedule views which allow the user to switch between different templates. -allow finding anything using integrated search. -can import the calendar from another app like outlook or apple calendar.

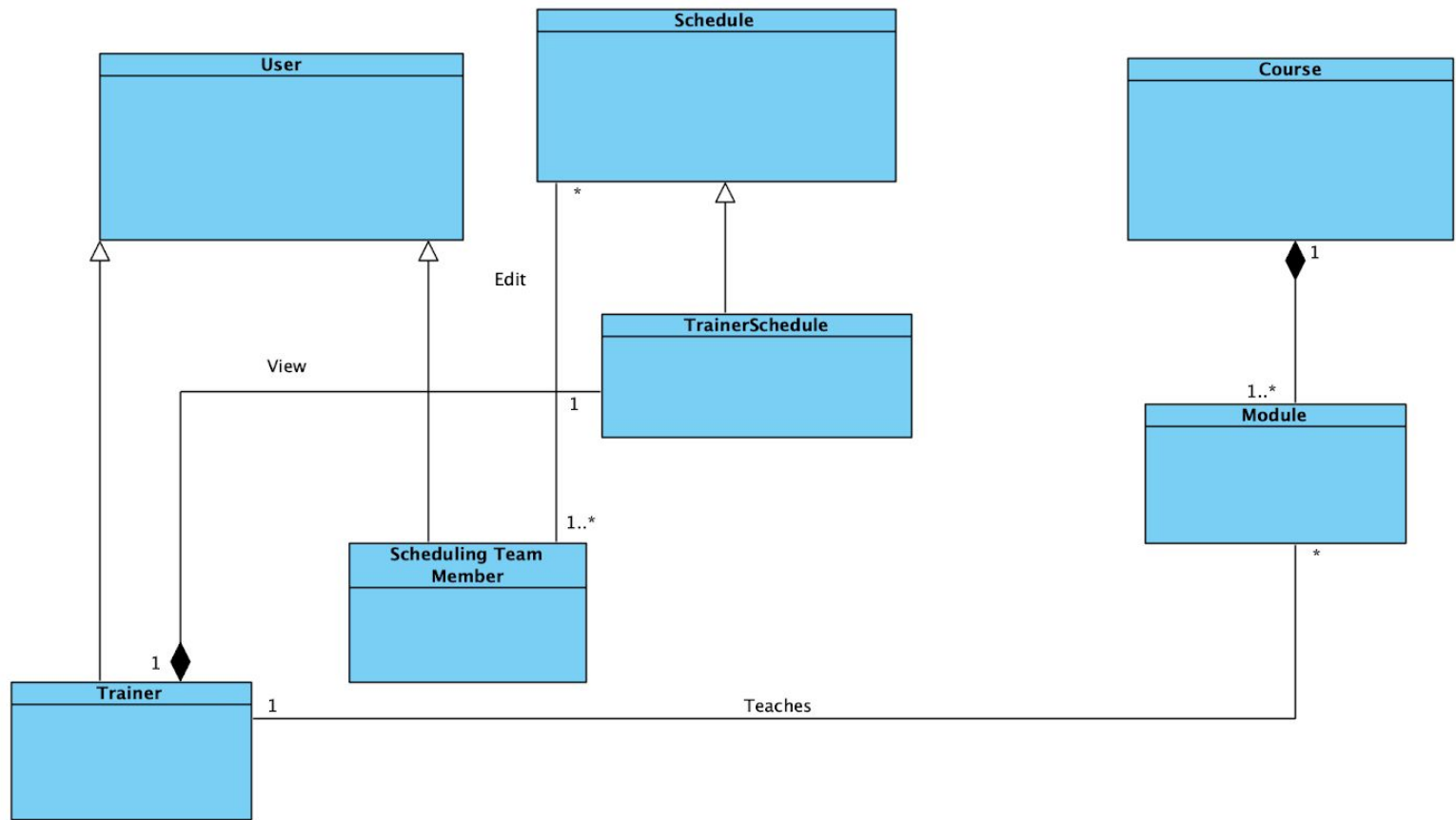
Advantages	<ul style="list-style-type: none"> -Send confirmation and reminder emails and texts -Allows to set the preferences to avoid last minute bookings. -Intelligently detects the time zone and displays the schedule time accordingly to the user. -Allows to remove the Calendly branding -Allows customizing your profile -Allows the users customers/invitees to make their booking directly from the Calendly. -allows user to add buffer time (extra 	<ul style="list-style-type: none"> -Allows to receive payments. -Allows to customise your own logo for your schedule. -Can integrate the schedule on your personal website. -Allows integrations for online meetings on platforms like Zoom, Google meet, GoToMeeting. -Can asks client to fill out their information through forms prior to meetings. -Automatic time zone conversions. -Can sync calendars from other calendar applications like outlook, iCloud or google Calendar[Acuity Scheduling. 2021]. 	<ul style="list-style-type: none"> -Can create multiple calendars simultaneously. - Suggests the type of the event while scheduling -Provides a great calendar view with relatable picture in the background of events -Detects the events from g-mail and sync it to the calendar. -Integrated search option allows the user to search through the calendar by referencing any information related to the event[Rampton, J.,2021].
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	<p>time before or after events).</p> <p>-Allows users to connect six of the online calendars like Google, outlook, office 365 or iCloud. So that the user never gets double booked[Calendly. 2021].</p>		
Disadvantages	-Got data mapping issues while filling forms.	-Provides all the advanced customisation features in the paid accounts.	-For using google calendar the user needs to have a google account.

Conclusion:

In conclusion, we can observe that each alternative functions appropriately as a schedule creator and editor. However, no alternatives were found that were capable of implementing the desired training process of FDM Group. None of them include a course creator that can allocate a qualified and available trainer to specific modules. Also, in all of the above applications, there is just one type of user but according to our requirements of the application, we need two types of users, Trainer who gets their schedule through this app and Scheduling team who is responsible for creating a course and assigning a suitable trainer to the course. All of these factors present an opportunity to fill a market gap and our software will aim to do so.

6. Domain Model



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